Granted Based on the First Transition Law of 8 July 1949
(WiGBl. page 175)

FEDERAL REPUBLIC OF GERMANY

PUBLISHED ON
21 APRIL 1952

GERMAN PATENT OFFICE

PATENT

***No.* 837 157**

CLASS **30 k** GROUP 12 04

M 5189 IX a / 30 k

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Inhaler

Patented in the territory of the Federal Republic of Germany from 16 July 1950

Patent application announced on 30 August 1951

Patent granting announced on 20 March 1952

The invention concerns an inhaler, especially a pocket inhaler, i.e., a small apparatus to be carried in the pocket for inhalation of, say, medicinal agents, like aromatic oils, menthol or the like.

A number of small inhalers that operate according to the principle of passing air under pressure through the substance to be inhaled are in use. This method has essential and serious drawbacks, especially in that an unduly concentrated mixture is produced by the air, pressurized, for example, by means of a rubber ball.

Inhalers have been proposed, in which these shortcomings are avoided, and in which the mixture of air and medicinal vapor being inhaled is conveyed by suction of air. However, these devices could not be introduced into practice, since they do avoid the essential shortcomings of inhalers operating with a rubber ball, but have other serious drawbacks in so doing.

Patent 561 647 describes an apparatus, consisting of two parts, in which, in each part designed as a tube, a liquid to be inhaled is situated, which conveys the substance to be inhaled through an immersed wick with air entering through an inlet opening and drawn in through the nasal openings. Such a device is comparatively very small (the two parts are supposed to be pushed into the nostrils), but such a device is not suitable for carrying in the pocket, merely because of the difficulty of the closure and easy breakability, etc.

These drawbacks are avoided by the device of

Patent 623 421, which consists of a supply vessel and a very small inhalation part. The actual inhalation device consists of a perforated piece, which is supposed to be placed on the nostril; air is drawn through its perforation from the outside through a porous element impregnated with the liquid being inhaled. This porous element, for example, is made of sintered kieselguhr and has the shape of a tablet. This tablet is impregnated by positioning the actual inhalation part on the supply vessel and tilting this vessel. In such a procedure, the difficulty now arises that, on the one hand, metering of the total amount of the substance to be inhaled is readily possible, because of the absorption capacity of the porous tablet and possibly a more or less complete impregnation is possible as needed, but metering of part of the substance to be inhaled into the drawn-in air stream is not possible. During suction of air through a tablet just impregnated, the concentration of substance to be inhaled in the drawn-in air is initially too large, as a result of the narrow air passages, to then diminish over time to an unduly small value. This device therefore has the deficiencies of devices operated with compressed air at the beginning, since the air, in fact, is drawn through the liquid, so to speak, and creates different drawbacks during subsequent operation.

According to the invention, an inhaler, especially a pocket inhaler, is now proposed, which does not have the aforementioned drawbacks, but, on the other hand, has a number of advantages and operates according to the principle of creating a mixture of air and the substance to be inhaled by suction of an air stream, but in which, in contrast to the last-mentioned variant, the air stream is not drawn through a more or less coherent layer of the substance to be inhaled, but is drawn along areas that release the substance to be inhaled through relatively wide spaces, so that the principle also differs from the aforementioned device operating with wicks, in which the air is not drawn in along the wick, but through it.

By this drawing-in of air along areas that release the substance to be inhaled through relatively wide spaces, a large uniformity of concentration of the substance to be inhaled is created in the drawn-in air mixture and the concentration can be relatively easily regulated in devices operated according to this principle.

According to a preferred variant, the flow direction of this air in the inhaler is essentially uniform and the areas that release the substance to be inhaled are arranged parallel to this straight flow direction.

According to another preferred variant, these areas consist of a piece that is spiral in cross-section.

These areas can consist of any substance that is not attacked by the substance to be inhaled, and preferably of a relatively rigid material, for example, a plastic.

According to a preferred variant, the surface of these areas that release the substance to be inhaled is designed absorbent, especially by covering the areas with an absorbent material, especially an absorbent fabric.

Under some circumstances, it can also be advantageous to divert the air stream of the inhaler, in which the areas, along which the air stream flows, are then expediently provided with openings or cutouts offset relative to each other.

Since the areas according to the invention are always designed and arranged so that they leave relatively wide spaces between them and the air flows either in a single direction or with deflection on these areas over their entire length or a significant part of their length, the substance to be inhaled is released from the absorbent areas in equal amounts and an essentially uniform concentration in the drawn-in air stream is ensured during a relatively long time.

The absorbent material, of which either the areas, for example, the areas arranged in a spiral themselves, or their coverings consist, can even contribute to impregnation and add to the fact that these substances fully or partially reach a liquid container positioned beneath these areas. A procedure can also be used, in which these areas are impregnated with an amount of liquid, so that no additional liquid is situated in the inhaler outside of the liquid absorbed by the areas or their coverings.

Since closure of the inhaler is possible without difficulty in the procedure according to the invention, this can be carried out without loss of the inhalate.

According to a preferred variant of the invention, the areas that release the substance to be inhaled, preferably designed coherent, are accommodated in an enclosure or container with an intake opening and suction opening, the container being closed up to these openings, and in which these openings can be easily closed.

According to a preferred variant, a closure element that closes the suction opening from the inside, and preferably regulates the amount of the air stream, is provided.

According to another preferred variant, the areas or the area part, the closure element and the closure piece for the outer enclosure are connected to each other, in which case, according to another preferred variant, a tube piece for suction of air, carrying the closure element of the suction opening and movable relative to the closure element, preferably movable

helically by rotation, is connected to this combined device, whose air suction opening or openings can be closed and opened by displacement relative to the closure piece, so that the closure position of the closure element, with reference to the suction opening, is also the closure position of the closure piece with reference to the air inlet opening or openings of this tube and the open positions on both sides correspond to each other.

In most cases, a circular cross section of the container and the parts forming the inhaler are preferred, but, under some circumstances, it can be appropriate to give the inhaler a different cross section, in which case the cross section of the areas or area part and other parts can be the same as the cross section of the closure. The cross section of the closure piece is naturally then the same as the cross-sectional shape of the container. Such a deviation from a circular cross section is recommended, for example, when the top of the inhaler is designed to accommodate the bottom of the nose, so that an essentially triangular cross section is created.

Preferred variants of the inhaler according to the invention are shown in the drawing in its application as a pocket inhaler.

Fig. 1 shows a cross section through a relatively simple, but reliably operating, variant of the inhaler;

Fig. 2 shows a section through a preferred variant with improved closure and regulation, in which Fig. 2a shows the operating device carrying the closure element and Fig. 2b shows a perspective view of the combined device, consisting of area part, closure elements, operating device and closure piece;

Fig. 3 shows a perspective view of another preferred variant of the inhaler according to the invention with an essentially triangular cross section, whereas Fig. 3a shows a cross section and Fig. 3b a top view of such a device;

Fig. 4 shows a perspective view of another variant of an area element;

Fig. 5 shows the top view of another design of the areas.

The bottle-like enclosure 1 has a conical opening 2 and an essentially cylindrical part 3, in which an area element 4 with areas that are spiral in cross section is inserted, which is held by means of a plug or closure piece 6 in the enclosure 3. The plug 6 is enclosed on its lower end by a sleeve 5, which fits with the cylindrical areas of the enclosure 3. A free space is left beneath the area piece 4, into which the end of the tube 7 discharges, which is connected via a suction opening 9 in the conical opening 2 of the bottle 1 to the outside air.

By suction of air through the intake opening 8 of the conical opening 2, for example, by introduction of the conical opening 2 into a nostril, air is drawn in through the suction opening 9 and tube 7 and then runs along the areas of the area element 4 straight to the suction opening 8.

The intake opening 8, like the suction opening 9, is also closeable by a screw cap 10.

In the variant of Fig. 2, the closure piece, area element, air suction device are combined with each other and provided with a closure and control device for the line 16 leading to the intake opening 8.

If, after removal of the plug 6, the fabric covering of the areas 4, consisting for example of stainless steel, is impregnated with a liquid to be inhaled and the plug 6 is reinserted, the air stream absorbs vapors of this substance.

The area element 4 is then firmly connected to the closure plug 12, so that the area element can be introduced into the enclosure 3 with the closure plug. A closure and control device is connected movably relative to the closure plug 12 and area element 4, which is arranged centrally, so that a conical closure element 15 can be pushed, in relation to the walls of the conical line 16, to the intake opening 8, so that this line can either be fully closed or controllably opened. The conical closure element 15 is fastened to an operating device 11 that passes through the closure plug 12, which can be operated from below, in terms of closure or opening. The air feed 13 is accommodated in this operating device, so that a suction opening 18 or several such openings are provided in the lower part of the operating device 11 and an opening 19 or several openings 19 beneath the area element 4, from which the air entering at 18 emerges to then flow along the areas of the area element 4 around the conical closure piece 15 through the line 16 to the intake opening 15 [sic].

The suction opening 18 is accommodated in the tubular part 13 of the operating device 11, so that it is closed by the closure piece or stopper 12 when the conical closure element 15 closes the line 16.

In this closed position, the inhaler is therefore sealed to the outside, so that the liquid to be inhaled contained in it cannot escape.

Operation of the conical closure element 15 through the operating device 11 occurs according to this variant by rotating the lower part of the rod 11, in which a helical recess (not shown) is provided in the walls of the tubular part 13 of the rod, which cooperates with a

pin 14 fastened in the closure plug 12 for a height displacement by rotation in known fashion.

According to Fig. 3, 3a and 3b, the enclosure 1 is formed roughly triangular in cross section with an upper recessed part 20 for insertion of the lower part of the nose with flattened walls 21.

The area element 4, according to the variant in Fig. 4, is provided with individual areas 22 that are arranged during an application according to Fig. 1 with cutouts, offset relative to each other, on the tube 7, in which the other parts of the deflection guides are formed by the walls of the container 1. In this variant as well, the air runs along the areas 22 and parallel to them in the individual sections.

In the variant in Fig. 5, the area element 1 is provided with radially arranged areas 23, along which the air flows in a straight direction.

CLAIMS:

1. Inhaler, especially a pocket inhaler, with areas that release the substance to be inhaled to air drawn through the inhaler, characterized by areas arranged in the direction of the air stream or air streams drawn-in along them, leaving relatively wide spaces for this air.

2. Inhaler according to Claim 1, characterized by the fact that the air stream is guided in an essentially straight direction and the areas that release the substance to be inhaled are arranged parallel to this air stream.

3. Inhaler according to Claim 2, characterized by the fact that the areas that release the substance to be inhaled consist of a helically wound piece.

4. Inhaler according to Claim 1, characterized by the fact that the areas are provided with openings or cutouts arranged offset to each other with deflection of the air flowing along them.

5. Inhaler according to Claim 1, 2, 3 or 4, characterized by the fact that the surfaces of the areas that release the substance to be inhaled are absorbent.

6. Inhaler according to Claim 5, characterized by the fact that the areas are covered with an absorbent material, especially absorbent fabric.

7. Inhaler according to Claim 1, 2, 3, 4, 5 or 6, characterized by the fact that the areas that release the substance to be inhaled are accommodated in a closed container or enclosure provided with intake opening and suction opening for the air flowing through, for example, a bottle-like container.

8. Inhaler according to Claim 7, characterized by the fact that the bottle-like container is closed to store the liquid being inhaled and the intake opening and suction opening are designed closable.

9. Inhaler according to Claim 7 or 8, characterized by the fact that that the expediently conical line (16) leading through the intake opening (8) is closeable by an expediently conical closure element (15) movable in it and controllable in its passage cross section.

10. Inhaler according to Claim 9, characterized by the fact that the operating device (11) of the closure element (15) is provided with a tubular part (13), through which the drawn-in air is taken in and introduced, and beneath which the areas (4) that release the substance to be inhaled are guided.

11. Inhaler according to Claim 10, characterized by the fact that the operating device (11) is arranged movable, especially movable by rotation, in the piece (12) that closes the container (3) during closure or opening of the suction opening (18) of the tubular part (13) according to closure or opening of the line (16).

12. Inhaler according to Claim 9, 10 or 11, characterized by the fact that the areas or area part (4) are or is connected firmly to the plug (12) that closes the container (3).

13. Inhaler according to Claim 7 or 8, characterized by the fact that the intake opening (8) is provided on the upper end of a conical neck (2) of a container (1) accommodating the area part (4) with an air suction tube (7) passing through the wall of the conical neck (2), discharging into the outside air (9) and guiding the air beneath the area part (4).

14. Inhaler according to Claim 13, characterized by the fact that the intake opening (8) and the suction opening (9) are closeable by an expedient screw-on cap (10).

15. Inhaler according to Claim 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14, characterized by the fact that the container (1) is designed with a triangular cross section with a recess for insertion of the bottom of the nose.

1 page of drawings appended

[symbol] 5139 4.52

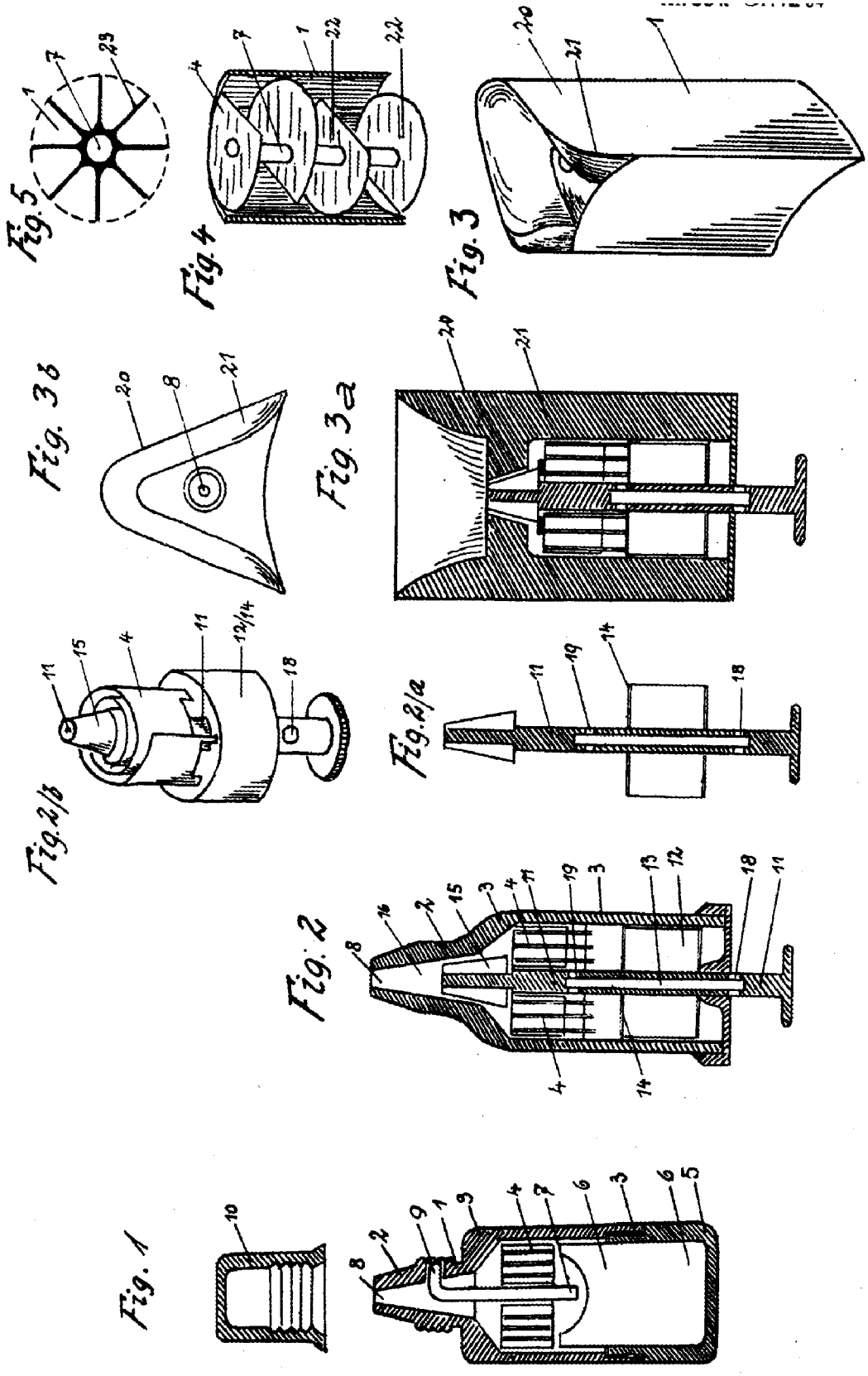
Fig. 1
Fig. 2
Fig. 2/a
Fig. 2/b
Fig. 3a
Fig. 3b
Fig. 3
Fig. 4
Fig. 5